TABLE OF CONTENTS FOR FIELD OPERATIONS OPERABLE UNIT 2 SPECIFIC OPERATING PROCEDURES

Rocky Flats Environmental Technology Site

4-I59-ENV-OPS-FO.41

REVISION 0

SYSTEM NORMAL OPERATIONS
OPERABLE UNIT 2, FIELD TREATABILITY UNIT

APPROVED BY _____ J M C Broussard 5-15-95

Manager — Print Name — Date

Environmental Operations Management

_____ J R S Luker 5/10/95

Quality Assurance Manager — Print Name — Date

Data Management and Reporting Services

DOE RFFO/ER Concurrence on file ☑ Yes ☐ No ☐ NA

Environmental Protection Agency Approval Received. ☐ Yes ☐ No ☐ NA

Responsible Organization Environmental Operations Management Effective Date 5/22/95

REVIEW BY THE FOLLOWING DISCIPLINES IS DOCUMENTED IN THE PROCEDURE HISTORY FILE

Data Management and Reporting Services
Environmental Operations Management
Waste Management
Industrial Hygiene
Occupational Safety
Operable Unit 2 Closure
Radiological Health and Engineering
Surface Water Division

USE CATEGORY 3

ORC review not required

The following have been incorporated in this revision
94 DMR 000189

Periodic review frequency 1 year from the effective date

LIST OF EFFECTIVE PAGES

Pages	Effective Date	Change Number
1-35	5/22/95	94-DMR-00089

TOTAL NUMBER OF PAGES 35

TABLE OF CONTENTS

1 PURPOSE

This procedure describes the administrative and operations steps at the Rocky Flats Environmental Technology Site for treating surface water through the Operable Unit 2 (OU2) surface water Field Treatability Unit (FTU) The operating instructions include detailed descriptions and instructions for normal operation of the FTU treatment system

2 SCOPE

This procedure applies to all Environmental Restoration Program Division (ERPD) Operations Support and subcontractor personnel

This procedure addresses the following topics

- Preparation for FTU treatment system startup
- Preparation for FTU treatment system shutdown
- FTU treatment system startup
- Operation of the filtration operating cycle
- FTU treatment system recirculation
- Placing the FTU treatment system on-line following recirculation
- FTU treatment system shutdown

3 OVERVIEW

This procedure implements the requirements for normal operations of the FTU treatment equipment at the OU2 surface water FTU facility located in Trailers (T) 900A, 900B, and 900C The FTU treatment system can process 60 gpm of contaminated surface water

Following the requirements of this procedure ensures that normal operations of the water treatment system occur in a uniform and safe manner This procedure is used by the operator(s) during normal operation of the OU2 FTU treatment system

The FTU consists of the following subsystems

- Surface water collection and equalization
- Chemical treatment
- Concentration and microfiltration
- Neutralization
- Solids dewatering
- Granular Activated Carbon (GAC) absorption

4 RESPONSIBILITIES

4 1 Operator

Operates and monitors the FTU system equipment

Ensures that the chemical supplies are sufficient

Reports abnormal conditions occurrences and incidents to Shift Foreman

Ensures visitors comply with the Rocky Flats Plant OU2 FTU Health and Safety Plan (HASP)

Completes required logs and forms

4 2 Responsible Manager

Ensures that all personnel including subcontractors are trained and qualified to perform the duties tasks and responsibilities described in this procedure

Ensures that all core and ERPD-specific training has been completed and documented, and that copies of all documentation have been forwarded to the ERPD training files

4.3 Shift Foreman

Responds to and reports all spills in accordance with 1-10000-HWR Hazardous Waste Requirements Manual Section 4 0

5 LIMITATIONS AND PRECAUTIONS

Wherever chemicals are stored and dispensed extreme care shall be taken

- The HASP is the governing safety document and shall be followed by all ERPD Operations Support and subcontractor personnel
- Startup of the system requires two Qualified Operators

Care shall be taken to prevent objects from falling into tanks

- If an object falls into one of the tanks, retrieve the object in a safe manner
- Loose clothing and long hair shall be kept away from rotating parts such as mixer shafts and pump fans

The coupling guard shall be in place whenever the process pump is running

5 LIMITATIONS AND PRECAUTIONS (continued)

- All metering pump hoses shall be properly secured to avoid spraying chemicals

6 PREREQUISITES

6 1 Planning and Coordination

Operator

[1] Attend a pre-shift safety briefing covering normal plant operation prior to the initiation of this procedure

Project Manager

[2] Conduct a pre-shift safety briefing covering normal plant operation prior to the initiation of this procedure

6.2 Field Preparation

6.2 1 Preparation for Startup

Operator

[1] Don the appropriate Personal Protective Equipment (PPE) as required in the HASP

[2] Energize the control panels in T900A and T900B as follows

[A] Verify that all control switches on the control panels are OFF

[B] Depress POWER ON and observe that the POWER ON pushbutton lamp illuminates after depressing each pushbutton

NOTE 1 *Placing the control switch for a valve or pump in HAND will illuminate the control switch, indicating the valve is open or the pump is running*

NOTE 2 *Placing the control switch for a valve or pump in AUTO may or may not illuminate the control switch and cause the valve or pump to operate, depending on control logic*

[3] Place all automatic valve control switches on the T900A control panel in AUTO

- AV-8
- AV-9
- AV-11
- AV-12
- AV-13
- AV-14
- AV-15

6.2 1 Preparation for Startup (continued)

Operator (continued)

- AV-16
- AV-17
- AV-18
- AV-19
- AV-30
- AV-35

[4] Clean and calibrate the system pH probes prior to system startup

[A] Ensure that the following control switch(es) are in OFF for the associated probe

- pH-1 for Acid Metering Pump MP-1-1
- pH-2 for
  - Auxiliary Metering Pump MP 5-1
  - Lime Recirc/Delivery Valve
  - Lime Recirc/Delivery Pump TP-6-1
- pH 11 for Acid Metering Pump MP-11-1

CAUTION

Scratching or shattering probe tip components during removal and installation of probe may cause the probe to become inoperative

[B] Remove the selected probe from its tank mounting

[C] Immerse the probe tip in a minimum of one in of hydrochloric acid (HCl) for a minimum of 30 seconds

[D] Remove the probe from the acid and rinse it with distilled water

[E] Place the probe in a pH 7 0 buffer solution and monitor the pH reading

The reading may only vary plus or minus 0 05 standard units of the buffer solution value or the OFFSET rheostat must be adjusted

[F] **IF** the pH probe requires adjustment
THEN use the OFFSET fine adjustment rheostat located inside the pH indicator display panel The Shift Foreman s approval is required for changing the setting of the coarse adjustment rheostat

[G] Remove the probe from the 7 0 buffer solution and rinse it with distilled water

6.2.1 Preparation for Startup (continued)

Operator (continued)

[H] Place the probe in a pH 10 0 pH-2, and pH-11 buffer solution,
OR in a pH 4 0, and pH-1 buffer solution,
AND monitor the pH reading

The reading may only vary plus or minus 0 05 standard units of the buffer solution value or the SPAN rheostat must be adjusted

[I] IF the pH probe requires adjustment,
THEN use the SPAN fine adjustment rheostat located inside the pH indicator display panel The shift foreman's approval is required for changing the setting of the coarse adjustment rheostat

[J] Following each adjustment, re-check the reading obtained in both buffer solutions

[K] After a satisfactory calibration is achieved, carefully place the probe back in its tank mounting and tighten its threaded cap

[L] Repeat steps [4][A] through [4][K]for all pH probes

NOTE 1 *The recommended solids concentration is 2 to 5% by weight and the duration of transfer will depend upon the percent solids from the previous processing run The percent solids are determined by the laboratory procedure located in the front of the percent solids logbook*

NOTE 2 *A higher concentration of solids may be pumped to TK-12 by performing transfers after the solids in TK-8 have settled*

[5] To transfer concentrated solids from Concentration Tank TK-8 to Sludge Holding Tank TK-12, perform the following

[A] Ensure there is adequate room in TK-12 prior to transferring sludge

[B] Verify that V-23 is OPEN

CAUTION

Use of the AUTO setting of the sludge pump is not recommended because TK-12 can overflow if the water return line becomes clogged

[C] Place the SLUDGE PUMP SP-1 control switch in HAND

[D] Monitor tank level during transfer operations

6.2 1 Preparation for Startup (continued)

Operator (continued)

[6] Start all mixer pumps

[A] At the control panel in T900A, place the MIXER MX-11 control switch in AUTO

[B] At the control panel in T900B place the control switch for the following mixers in ON

- MX-1
- MX-2
- MX-5
- MX 6

[C] Place the switch on the power cord to mixer MX-4 in ON and observe mixer pump shaft turning

[7] Place the AUXILIARY METERING PUMP MP 5-1 control switch in AUTO

[8] Verify that all chemical supplies for use by the system are sufficient

- Sulfuric Acid (H_2SO_4) for use in Reaction Tank TK-1 and Neutralization Tank TK-2
- Lime (calcium hydroxide) ($Ca(OH)_2$) for use in Reaction Tank TK-2
- Ferric sulfate ($Fe_2(SO_4)_3$) for use in TK 1
- Sodium Hydroxide (NaOH) for use in TK-2

[9] Ensure that the recommended concentrations in the chemical feed tanks are

- <u>Sulfuric Acid Feed to TK-1</u>
  Prepare a 20% solution of H_2SO_4 by adding 20 gal of 93% to 98% H_2SO_4 to 80 gal of water

- <u>Ferric Sulfate Feed to TK-1</u>
  Add 1 lb of ferrifloc per 1 gal of water

NOTE *Ferrifloc is the trade name for acidified $Fe_2(SO_4)_3$ Ferrifloc contains 89 % ferric sulfate and ferric sulfate contains 28% iron Therefore Ferrifloc contains 25% iron and 1 lb of Ferrifloc per gal is equivalent to 0 25 lb of iron per gallon*

6.2 1 Preparation for Startup (continued)

Operator (continued)

- Lime Feed to TK-2
  For the Wilden M 025 Pump delivery system, add 1 lb of $Ca(OH)_2$ per 8 gal of water This solution weighs approximately 1 5% $Ca(OH)_2$

  For the Warren Rupp Pump delivery system, add 1 lb of $Ca(OH)_2$ per 1 gal of water This solution weighs approximately 12% $Ca(OH)_2$

NOTE *Higher concentration solutions of lime may be used provided that the lime delivery lines do not become plugged*

- Sulfuric Acid Feed to TK-11 (Neutralization)
  Prepare a 3% solution of H_2SO_4 by adding 1 5 gal of 93% to 98% H_2SO_4 to 50 gal of water

- Caustic feed to TK-2
  Obtain a 25% solution of caustic from the chemical supplier in drums, or prepare by adding 1 gal of 50% NaOH to approximately 1 5 gal of water

[10] Adjust metering pump frequency and stroke as follows

- Sulfuric Acid to TK-1
  Perform the initial adjustment by setting the frequency at 50 and the stroke at 50 and adjusting until overshoot (pH below specifications) in TK-1 is minimized, pH 1 probe controls delivery to maintain pH between 3 5 and 5 0

- Ferric Sulfate Feed to TK-1
  Determine the ferric sulfate feed rate by the influent flow rate and the desired iron concentration. Use the following calculation to determine the correct feed rate

$$\frac{\text{Influent Feed Rate (gal/min.) X 3.785 L/gal X Treated Water (mg/ml)}}{\text{Desired Concentration of Iron in}} = \text{Feed Rate for Ferric Sulfate Iron concentration in Ferric Sulfate Feed (mg/ml)}$$

Example $\frac{60 \text{ gpm} \times 3.785 \text{ l/g} \times 15 \text{ mg/l}}{30 \text{ mgFe/ml}} = 113\ 6 \text{ ml/min}$

The normal desired concentration will be 15 mg Fe/l and the iron concentration in the ferric sulfate feed will be 30 mg/ml if 1 lb of Ferrifloc is added per 1 gal of water

6.2 1 Preparation for Startup (continued)

Operator (continued)

- Lime Feed to TK 2
  Control the lime feed using one of the following methods

  - pH control method
    Control the lime feed to TK-2 with probe pH 2 The Warren Rupp Pump continuously recirculates the lime slurry Use the air operated pinch valve to add lime as required A diaphragm valve located between the pinch valve and TK-2 allows adjustment of the amount of lime added per cycle of the pump to minimize overshoot of the pH The system normally operates within a pH range of 9 8 to 11 0

    Volumetric method
    Add lime directly to TK 2 at a continuous predetermined addition rate using the Wilden M 025 Pump and a direct line to TK-2 Control the addition rate by varying the pump air supply pressure by adjusting the air regulator on the supply to the pump Also adjust lime addition rate as needed by varying the lime slurry concentration in the lime tank

  Sulfuric Acid Feed to TK-11
  Set the metering pump to add sulfuric acid as required by pH-11 Adjust the stroke and frequency to assure that the pH remains between the required band of 6 0 to 9 0 when acid is added to the neutralization tank Minimize overshooting as much as possible

- Caustic Feed to TK-2
  Probe pH 2 controls the caustic feed to TK-2 when the lime system is in the volumetric method The metering pump stroke and speed are adjusted to minimize overshoot of the desired pH range of 9 8 to 11 0

[11] Ensure that all metering pumps are operational using the following procedure for each pump

[A] Place the control switch on the control panel for the selected metering pump in HAND

[B] Place the control switch from HAND to AUTO

[12] Using a graduated cylinder and stop watch or watch with a second hand monitor the discharge of the ferric sulfate and lime volumetric metering pumps for correct feed rate

6.2 1 Preparation for Startup (continued)

Operator (continued)

NOTE *Information to accomplish Steps [13], [14] and [15] is located in the pump service manual portion of the Resource Technologies Group, Inc Operations and Maintenance Manual Rocky Flats Chemical Treatment and Microfiltration System manual, located in T900D*

[13] **IF** a metering pump becomes air bound and requires priming,
THEN follow the instructions contained in the pump service manual

[14] Ensure that oil is VISIBLE in the glass oiler for process pumps

[15] **IF** oil is **NOT** VISIBLE in the glass oiler for a process pump
THEN add oil to the process pump oiler as recommended in the pump service manual

[16] Record all activities in the OU2 Operations Log Book

6.2.2 Preparation for Shutdown

Operator

[1] Ensure that TK-11 level is high enough so cleaning cycles will operate in AUTO

[2] Ensure that the pH in TK-11 is between 6 0 and 9 0 standard unit.

[3] Record all activities in the OU2 Operations Log Book.

7 INSTRUCTIONS

7 1 System Startup

Operator

[1] Open the following manual valves in T900A

- V 2
- V-3
- V-4
- V-5
- V 6
- V-7
- V 29

[2] Open V 95 in T900B

NOTE *Operation of the membrane system may continue with one of the membrane trains isolated for service or maintenance*

[3] To operate through the middle and bottom trains only, perform the following

[A] Close

- V 2
- V 7
- V-41

[B] GO TO Step [6]

[4] To operate through the top and bottom trains only perform the following

[A] Close

- V 3
- V 6
- V-40
- V-41

[B] GO TO Step [6]

7 1 System Startup (continued)

Operator (continued)

[5] To operate through the top and middle trains only, perform the following

[A] Close
- V-4
- V-5
- V-40

[B] GO TO Step [6]

[6] Perform the following in the GAC trailer

[A] Depress START for the feed pump to reset low Equalization Tank level feed pump shut off which occurs at the end of the previous run.

[B] Open V-203 and V-204

[B] Throttle open V-205 to accommodate the expected flow rate

[C] Close V-206 and V-207

This action will recirculate flow through the MEMTEK system and back to the Equalization Tank until the discharge pH from TK-11 is within specifications (6 0 to 9 0) Recirculate water that is not within the specified pH range

[7] Energize the pH-11 strip chart recorder in T900B, and record the recirculation start date and time on the strip chart

[8] Place the TURBIDITY MONITOR PUMP control switch in ON

[9] Place the Turbidity Meter toggle switch to ON, and observe needle deflection, indicating the meter is ON

[10] Ensure that the Range Select switch on the turbidity meter is set so that the reading is close to mid-range on scale

7 1 System Startup (continued)

Operator (continued)

NOTE 1 *Placing the control switch for a valve or pump in HAND will illuminate the control switch indicating the valve is open or the pump is running*

NOTE 2 *Placing the control switch for a valve or pump in AUTO may or may not illuminate the control switch and cause the valve or pump to operate depending on control logic*

[11] Place the FEED PUMP FP 1 control switch on the control panel in T900B in AUTO

[12] Place the FEED PUMP FP-1 control switch in T900A in ON

[13] Place the LIME RECIRC/DELIVERY PUMP TP-6-1 control switch in ON

[14] Ensure that there is adequate flow through the influent rotameter located above V-96 adjacent to TK-1

[15] Place the SEAL FLUSH WATER PUMP TP-11 2 control switch in AUTO

NOTE *The process pump PP 8-1 operates the membrane module trains Level control LC-8 2 in concentration tank TK-8 starts the pump as the tank fills Operating the process pump in the HAND position requires continuous monitoring of concentration tank level*

[16] Place the PROCESS PUMP PP 8-1 control switch on the control panel in T900A in AUTO

NOTE *Altering the order in which pumps are started may be necessary due to various tank levels and membrane flow rates that are part of normal operations*

[17] Ensure that seal water flow rate through PROCESS PUMP PP 8-1 and CLEANING PUMP CP 1 seals is a minimum of 0 1 gpm by measuring the seal water system discharge into TK-8 with a graduated cylinder and a stop watch or watch with a second hand

NOTE *Once the process pump is operating filtrate should be flowing to the filtrate neutralization system Concentrate should be returning to concentration tank TK 8 The system should be operating without any alarm conditions triggered*

[18] Place the FILTRATE TRANSFER PUMP TP 11 1 control switch in HAND

7 1 System Startup (continued)

Operator (continued)

[19] Set the EFFLUENT FLOW CONTROLLER (EFC) to 25 to 50 gpm

[20] **WHEN** discharge pH from TK-11 is stable between the specified range of 6 0 to 9 0 su, **THEN** discontinue recirculation to the equalization tank and begin discharging through the lead and polish vessels as follows

[A] Open V-206 and V-207

[B] Close V-203 and V-204

[21] Monitor the lead GAC pressure gauge when adjusting the flow rate to avoid exceeding 15 psig which could cause rupture disc failure

[22] Slowly adjust desired discharge flow rate with V-205, pressure relief valve, to prevent rupture disc failure in the lead GAC unit When making adjustments to V-205, back off flow and pressure by opening V-203 and V-204

[23] Record discharge start time on the pH strip chart on control panel in T900A

[24] Record discharge start time and equalization tank level on the GAC and Process Trailer Logs

[25] Monitor pressure and flow through the GAC vessels for the first 15 min of discharge to the GAC vessels, to ensure that the pressure and flow have stabilized

[26] **IF** influent flow rate to TK-8 needs adjustment to control tank level
THEN throttle feed control valve V-96, which is located below the rotameter by TK-1

NOTE *Normally TK-11 level is controlled by adjusting effluent flow rate using the Effluent Flow Controller EFC but this may not be sufficient if membrane flow rates are high*

[27] **IF** the EFC is set to 25 to 50 gpm, and TK-11 level rises above the desired level, **THEN** open valve AV-35 by placing its control switch in ON to return water from the outlet of the membranes back to TK-8

Be aware that this will affect liquid level in both TK-11 and TK-8

7 1 System Startup (continued)

Operator (continued)

[28] **IF** TK-11 liquid level continues to rise,
THEN throttle close valve V-100 to further reduce flow into TK-11 It is preferable however, to leave V-100 completely open whenever possible, as throttling will decrease membrane flow rate and increase the rate of membrane fouling

[29] Record all activities in the OU2 Operations Log Book

7.2 Filtration Operating Cycle

Operator

[1] Refer to 4-I63-ENV OPS-F0 45 Chemical Handling and Mixing Operations Operable Unit 2 Field Treatability Unit for instructions for preparation of process chemicals

[2] Complete Facility Operations Logs contained in Appendix 1, Facility Operations Forms

[3] **IF** required to prime or set metering pumps,
THEN refer to Section 5

[4] Verify that fresh water is flowing through the process and cleaning pump seals by observing flow into TK 8

NOTE *The normal pH range for TK 1 is 3.5 to 5 for TK 2 is 10 to 11 and for TK-11 is 6 to 9*

[5] **IF** the pH in TK-1, TK-2, or TK 11 is **NOT** in specification
THEN place the system in recirculation

NOTE *System pressure gauges require frequent monitoring to ensure proper system operation as provided by Table 1 Indicator Normal Operation Readings*

[6] Ensure that the filtrate is clear in appearance and is flowing to discharge at the proper flow rate as indicated by Flow Indicator Transmitter 1 (FIT-1) see Table 1

[7] Refer to the Resource Technologies Group Inc Operations and Maintenance Manual Rocky Flats Chemical Treatment and Microfiltration System manual for troubleshooting

[8] Record all activities in the OU2 Operations Log Book

TABLE 1
INDICATOR NORMAL OPERATION READINGS

LINE PRESSURE INDICATORS (PSIG)

MEMBRANE MODULES		PUMP WATER SEALS
PI-1	PI-2	PI-5
35-45	12-15	35-45

LINE FLOW INDICATORS (GPM)

WASTEWATER FEED	PUMP WATER SEALS
15-60 GPM	0 1 - 0 25 GPM MINIMUM

CONTROL PANEL FLOW INDICATOR/TOTALIZERS (GPM)

MEMBRANE MODULES
FIT-1
45-60 GPM MINIMUM

pH INDICATOR/CONTROLLERS (pH)

REACTION TK-1	REACTION TK-2	FINAL NEUT TK-11
pH-1	pH-2	pH-11
3 5-5 5	9 0 10 5	7 0-7 5 (Desired) 6 0-9 0 (Required)

7.3 System Recirculation

Operator

[1] Place the valves for the filtration operating cycle which is the normal operation mode according to the Valve Position Table Normal Operation in Appendix 2

[2] Open the following valves in the GAC trailer
- V-203
- V-204
- V-205

[3] Close the following valves in the GAC trailer
- V-206
- V 207

This will recirculate flow through the MEMTEK system and back to the Equalization Tank

[4] Record all activities in the OU2 Operations Log Book

7 4 Placing System On Line Following Recirculation

Operator

[1] Open the following valves in the GAC trailer
- V 206
- V-207

[2] Close the following valves in the GAC trailer
- V-203
- V-204

[3] Slowly close V-205 while observing GAC pressure and effluent flow rate

[4] Monitor the pressure and flow through the GAC vessels for the first 5 to 15 min of discharge to ensure that pressure and flow have stabilized

[5] Record all activities in the OU2 Operations Log Book

7.5 System Shutdown

The entire waste treatment system can be shutdown during emergency situations by pushing EMERGENCY STOP PUSHBUTTON at each panel in T900A and T900B This disables all panel power

Normally, the system will be shut down when the Equalization Tank reaches the low-level set point and automatically stops the feed pump

Operator

NOTE *If the feed pump control switch in T900B is in HAND instead of AUTO, the feed pump will not stop when the feed pump control switch in T900A is placed in OFF*

[1] Verify that the FEED PUMP FP-1 control switch on control panel in T900B is in AUTO

[2] Place the FEED PUMP FP-1 control switch on the T900A control panel in OFF

[3] WHEN the level in TK-8 has been reduced enough to allow enough room to accept the solids flush volume,
THEN

[A] Place the PROCESS PUMP PP-8-1 control switch in OFF

[B] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in OFF

[4] Place the pH strip chart recorder and turbidity monitor OFF, and record shutdown time on strip chart

[5] Close V-95 so water from the Equalization Tank cannot gravity flow through the system and overtop TK-8

[6] At the control panel in T900A, place all mixer and metering pump control switches to OFF

- MX-11
- MP-11-1
- MP-11-2

7.5 System Shutdown (continued)

Operator (continued)

[7] At the control panel in T900B place all mixer and metering pump control switches in OFF

- MX-1
- MX-2
- MX-5
- MX 6
- MP-4-1
- MP-5-1
- LIME RECIRC/DELIVERY PUMP and/or LIME RECIRC DELIVERY VALVE

[8] Place the switch on the power cord to mixer MX-4 in OFF in T900B

[9] Record the equalization tank level and time of shutdown in the OU 2 Operations Log Book and on the OU-2 System Process Flow Data Logs

[10] Flush the membrane modules in accordance with the Automatic Cleaning or Manual Cleaning instructions up to STEP 2 CHEMICAL CLEAN in 4-I60-ENV-OPS-FO 42 Chemical Cleaning Operations Operable Unit 2 Field Treatability Unit

[11] Manually stop the SOLIDS FLUSH just prior to Step 2 by depressing CYCLE STOP pushbutton

[12] Fill TK-10 as follows

[A] Place the FILTRATE TRANSFER PUMP TP-11-1 control switch in AUTO

[B] Place the TANK FILL SELECT switch to the TK-10 position and push TANK FILL START pushbutton

[C] **WHEN** AV-14 and AV-17 automatically close
THEN place FILTRATE TRANSFER PUMP TP 11-1 control switch in OFF

[13] **IF** the system is to be shutdown for more than 72 hours
THEN chemically clean the filter membranes in accordance with 4 I60-ENV-OPS-FO 42 Chemical Cleaning Operations Operable Unit 2 Field Treatability Unit

[14] Place all control switches on the control panels in OFF

[15] Depress EMERGENCY STOP pushbutton on both control panels to disable power to the system

[16] Record all activities in the OU2 Operations Log Book

8 RECORDS

Management of all records is consistent with 1-77000-RM-001, Records Management Guidance for Records Sources

Project Manager

[1] Ensure that the original and one copy, as required, of the following quality assurance (QA) records are transmitted to the ERPD Project File Center (PFC) in accordance with 2-G18-ER-ADM-17 01, Records Capture and Transmittal

- Facilities Operations Log(s)
- Process Flow Data Log(s)
- OU 2 Operations Log Book
- Qualification/Training Documentation
- Occurrence Reports

Submission of record copies to the ERPD PFC is in accordance with Administrative Record requirements as defined in 2-S65-ER-ADM-17 02, Administrative Record Document Identification and Transmittal

There are no non-QA records generated by this procedure

9 REFERENCES

Resource Technologies Group, Inc Operations and Maintenance Manual Rocky Flats Chemical Treatment and Microfiltration System

Rocky Flats Plant Operable Unit 2 Field Treatability Unit Health and Safety Plan

1-10000-HWR, Hazardous Waste Requirements Manual

1-77000-RM-001, Records Management Guidance for Records Sources

2-G18-ER-ADM-17 01, Records Capture and Transmittal

2-S65-ER-ADM-17 02 Administrative Record Document Identification and Transmittal

4-I60-ENV-OPS-FO 42, Chemical Cleaning Operations Operable Unit 2 Field Treatability Unit

4-I63-ENV-OPS-F0 45, Chemical Handling and Mixing Operations Operable Unit 2, Field Treatability Unit

APPENDIX 1
Page 1 of 6

FACILITY OPERATIONS FORMS

FLOW METER READINGS - WEIR #_____					
DATE	TIME				DAILY TOTALS
	0300	0900	1500	2100	
COMMENTS				WEEKLY TOTALS	

APPENDIX 1
Page 2 of 6

Date _____

OU2 SYSTEM PROCESS FLOW DATA (DAILY LOG) (day)										
TIME	FIT #1	FIT #2	pH TK 11	pH TK 1	pH TK 2	TURBIDITY RAW	TURBIDITY TREATED	MEMBRANE PSI IN	MEMBRANE PSI OUT	SEAL PSI
0600										
0700										
0800										
0900										
1000										
1100										
1200										
1300										
1400										
1500										
1600										
1700										

APPENDIX 1
Page 3 of 6

Date _____

OU2 SYSTEM PROCESS FLOW DATA (DAILY LOG) (night)										
TIME	FIT #1	FIT #2	pH TK 11	pH TK 1	pH TK 2	TURBIDITY RAW	TURBIDITY TREATED	MEMBRANE PSI IN	MEMBRANE PSI OUT	SEAL PSI
0600										
0700										
0800										
0900										
1000										
1100										
1200										
1300										
1400										
1500										
1600										
1700										

DAILY TOTALS

FIT #1_____
FIT #2_____

APPENDIX 1
Page 4 of 6

Date _____

OU2 SYSTEM SHIFT LOG (day)											
TIME	PRESSURE						LEAD dp	POLISH dp	DISCHARGE TOTALIZER	FLOW RATE	INSPECTOR COMMENTS
	6	7	8	9	10	11					
0600											
0700											
0800											
0900											
1000											
1100											
1200											
1300											
1400											
1500											
1600											
1700											

Shift Comments

APPENDIX 1
Page 5 of 6

Date _____

OU2 SYSTEM SHIFT LOG (night)											
TIME	PRESSURE						LEAD dp	POLISH dp	DISCHARGE TOTALIZER	FLOW RATE	INSP COMMENTS
	6	7	8	9	10	11					
0600											
0700											
0800											
0900											
1000											
1100											
1200											
1300											
1400											
1500											
1600											
1700											
	Daily Total										

Shift Comments

APPENDIX 1
Page 6 of 6

DATE

OU2 EQUALIZATION TANK LOG				
TIME	COLLECTION TOTALIZER	GALLONS SINCE LAST READING	COLLECTION FLOW RATE SINCE LAST READING	EQUALIZATION TANK LEVEL
0600				
0700				
0800				
0900				
1000				
1100				
1200				
1300				
1400				
1500				
1600				
1700				
1800				
1900				
2000				
2100				
2200				
2300				
2400				
0100				
0200				
0300				
0400				
0500				
0600				
DAILY TOTAL				

APPENDIX 2
Page 1 of 1

VALVE POSITION TABLE NORMAL OPERATION

VALVE NO	VALVE POSITION	VALVE NO	VALVE POSITION
V 1	0	V 58	O
V 2	0	V 59	C
V 3	0	V-61	C
V-4	0	V-64	0
V 5	0	AV 65	OAN
V-6	0	V-66	C
V 7	0	V 67	C
AV 8	C	AV 80	FLOW CONTROL
AV 9	C	V 81	C
V 10	0	V 82	0
AV 11	C	V 83	C
AV 12	C	V 84	C
AV 13	C	V 85	C
AV 14	C	V 86	0
AV 15	C	V 87	0
AV 16	C	V 88	C
AV 17	C	V 89	C
AV 18	C	V 90	C
AV 19	0	V 91	C
V 20	C	V 92	C
V 22	C	V 93	0
V 23	0	V 95	0
V 24	C	V 96	0AN
V 25	0	V 97	C
V 29	0	V 98	C
AV 30	C	V 99	C
V 31	0	V 100	0
V 33	C	V 101	C
V 34	C	V 102	C
AV 35	OAN	V 103	0
V 37	0	V 104	0
V 38	C	V 203	C
V 39	C	V 204	0
V-40	C	V 205	0
V-41	C	V 206	0
V 53	C	V 207	C
V 54	0		
V 55	C		
V 57	C		

KEY 0 = OPEN C = CLOSED OAN = OPENED AS NEEDED

APPENDIX 3
Page 1 of 1

VALVE POSITION TABLE - SYSTEM SHUTDOWN

VALVE NO	VALVE POSITION	VALVE NO	VALVE POSITION
V 1	0	V 58	C
V 2	C	V 59	C
V 3	C	V-61	C
V-4	C	V-64	0
V 5	C	AV-65	C
V 6	C	V 66	C
V 7	C	V-67	C
AV 8	C	AV-80	C
AV 9	C	V-81	C
V 10	0	V-82	0
AV 11	C	V-83	C
AV 12	C	V-84	C
AV 13	C	V-85	C
AV 14	C	V-86	0
AV 15	C	V-87	0
AV 16	C	V 88	C
AV 17	C	V-89	C
AV 18	C	V 90	C
AV 19	C	V 91	C
V 20	C	V 92	C
V 22	C	V 93	0
V 23	0	V 95	C
V 24	C	V 96	0
V 25	0	V-97	C
V 29	C	V 98	C
AV 30	C	V 99	C
V 31	0	V 100	0
V 33	C	V 101	C
V 34	C	V 102	C
AV 35	C	V 103	0
V 37	0	V 203	C
V 38	C	V 204	C
V 39	C	V 205	0
V-40	C	V 206	0
V-41	C	V 207	C
V 53	C		
V 54	0		
V 55	C		
V 57	C		

KEY 0 = OPEN C = CLOSED OAN = OPENED AS NEEDED

APPENDIX 4

Page 1 of 5

OPERABLE UNIT 2 SYSTEM VALVES

VALVE NO	SIZE/TYPE	MANUAL	LOCATION	FUNCTION
V 1	6 in BFLY*	M	Suction of PP-8 1	Feed to PP-8-1
V-2	6 in BFLY*	M	Discharge of PP-8-1	Feed to Top Train
V 3	6 in BFLY*	M	Discharge of PP 8-1	Feed to Middle Train
V-4	6 in BFLY*	M	Discharge of PP-8-1	Feed to Bottom Train
V-5	6 in BFLY*	M	Module Train Discharge	Discharge from Top Train
V 6	6 in BFLY*	M	Module Train Discharge	Discharge from Middle Train
V-7	6 in BFLY*	M	Module Train Discharge	Discharge from Bottom Train
AV 8	2 in BALL	A	Bottom Train Discharge	Cleaning Inlet
AV 9	2 in BALL	A	Top Train Inlet	Cleaning Outlet
V-10	2 in BALL	M	Cleaning Pump CP-1	Cleaning Pump Discharge
AV 11	2 in BALL	A	Cleaning Pump Discharge	Cleaning Return to TK1 and
AV 12	2 in BALL	A	TK 9	CP-1 Pump Suction
AV-13	2 in BALL	A	TK 10	CP-1 Pump Suction
AV-14	2 in BALL	A	TK 9	TK-10 Fill Inlet
AV-15	2 in BALL	A	TK 9	TK 9 Cleaning Return
AV-16	2 in BALL	A	TK 9	TK-9 Filtrate Return
AV 17	2 in BALL	A	TK 10	TK-10 Cleaning Return
AV-18	2 in BALL	A	TK 10	TK-10 Filtrate Return
AV-19	3 in BFLY	A	Filtrate to Neutralization	Filtrate Open/Close
V-20	2 in BALL	M	TK 9 and TK-10	TK 9 and TK-10 Drain
V 22	2 in BALL	M	TK 8 Drain	TK-8 Drain
V-23	2 in BALL	M	Sludge Pump	Sludge Pump Suction
V-24	2 in BALL	M	TK 11	TK-11 Drain
V-25	2 in BALL	M	TP 11-1 Inlet	TP-11-1 Suction
V 29	2 in BALL	M	TP 11-1	Flow Control to GAC
AV 30	2 in BALL	A	Top Train Inlet	Cleaning Return to TK-8
V 31	2 in BALL	M	TP 11 2	TP 11 2 Feed

* = Butterfly

APPENDIX 4
Page 2 of 5

VALVE NO	SIZE/TYPE	MANUAL OR AUTO	LOCATION	FUNCTION
V-33	2 in BALL	M	TK-9	Chemical Fill
V-34	2 in. BALL	A	TK-10	Chemical Fill
AV-35	2 in BALL	M	Filtrate above PP-8-1	Filtrate Return to TK-8
V-37	1/2 in BALL	M	Seal Water Filter	Seal Water Filter Isolation
V-38	2 in BALL	M	TP-11-1	Trailer No 1 Water Supply
V-39	2 in. BALL	M	TP 11-1	Trailer Hose Down
V-40	2 in. BFLY*	M	Bottom Train No 1	Train No 2 Isolation
V-41	2 in BFLY*	M	Middle Train No 2	Train No 3 Isolation
V-55	2 in BALL	M	Effluent from TK-6	Drain
V-57	2 in BALL	M	Effluent from TK-5	Drain
V-58	1 in BALL	M	Effluent from TK-5	Influent to Acid Metering
V-59	1 in BALL	M	Influent to TK-4	TK-4 Fill Water
V-61	1 in BALL	M	Top of TK-6	Lime Tank Water Fill
V-64	1/2 in BALL	M	Top of TK-1	Acid Delivery
V-65	11/2 in. BALL	M	Top of TK-2	Lime Delivery
V-66	2 in. BALL	M	Bottom, Left Side, TK-1	Drain
V-67	2 in. BALL	M	Bottom, Right Side, TK-2	Drain
AV-80	11/2 in BALL	A	Effluent from TK-11	Filtrate Discharge Flow
V-81	1/2 in BALL	M	Influent to TK-2	Sulfuric Acid Injection
V-82	1 in BALL	M	Effluent from Seal Water	Distribute Seal Water
V-83	3 in BALL	M	West End of T900A	Drain for T900A
V-84	1 in BALL	M	Top of TK-5	Influent Water to TK-5
V-85	1 in BALL	M	Influent Water to Lime	Lime Line Flush
V-86	1 in BALL	M	Effluent from TK-6	Lime Pump Suction Isolation
V-87	1 in BALL	M	Effluent from Lime Pump	Lime Pump Discharge Isolation

* = Butterfly

APPENDIX 4
Page 3 of 5

VALVE NO	SIZE/TYPE	MANUAL OR AUTO	LOCATION	FUNCTION
V-90	11/2 in BALL	M	Sludge Press	Effluent Sludge Filtrate
V-91	11/2 in BALL	M	Sludge Press	Effluent Sludge Filtrate
V-92	2 in BALL	M	Effluent from Sludge Wilden Pump	Drain
V 93	2 in BALL	M	Sludge Pump Suction	Sludge Pump Suction Isolation
V-94	3 in BALL	M	West End of T900B System	Drain for T900B
V 95	2 in BALL	M	Influent to TK-1	Influent Isolation
V-96	2 in GATE	M	Influent to TK-1	Flow Adjust to TK-1
V 97	1/2 in BALL	M	Influent Air to Filter Press	Blow Down Filter Press
V 98	2 in BALL	M	TK 11 Filtrate	Recirculation from TK-11 to
V 99	2 in BALL	M	Effluent from TK-11	Recirculate TK 11
V-100	3 in GATE	M	Membrane Discharge	Control Flow to TK-11
V-101	2 in BALL	M	Above TK-2	Cleaning Pump Discharge to TK-2
V-102	2 in BALL	M	Above TK-2	Cleaning Pump Discharge to
V-103	3/4 in BALL	M	Influent to TK-12	TK-12 Flush Line
V 200	2 in BALL	M	Influent Line to GAC	Processed Water into GAC
V 201	2 in BALL	M	Effluent from EQ** Tank	Influent to TK-1
V 202	3 in BALL	M	Effluent Line to EQ**	Influent to Pump or Sock
V 203	2 in BALL	M	Influent Line to GAC	Recirculation to EQ** Tank
V-204	2 in BALL	M	Influent Line to GAC	Recirculation to EQ** Tank
V 205	PRESSURE	M	Influent Line to GAC	GAC Pressure Adjustment
V 206	3 in BALL	M	Treated Effluent Line	Treated Effluent

** = Equalization

APPENDIX 4
Page 4 of 5

VALVE NO	SIZE/TYPE	MANUAL	LOCATION	FUNCTION
V-207	3 in BALL	M	Return Line to EQ** Tank	Effluent Return to EQ**
V-208	3 in BALL	M	Treated Effluent Line	Influent to GAC A
V-209	3 in BALL	M	Return Line to EQ** Tank	Backwash Return to EQ**
V-210	3 in BALL	M	Middle Line GAC Piping	Isolation Valve
V-211	3 in BALL	M	Treated Effluent Line	Effluent from GAC A
V-212	3 in BALL	M	Return to EQ** TK	Backwash or Rupture Disk
V-213	3 in BALL	M	Treated Effluent Line	Influent to GAC B
V-214	3 in BALL	M	Return to EQ** TK	Backwash Return to EQ**
V-215	3 in BALL	M	Treated Effluent Line in	Treated Effluent Discharge
V-216	3 in BALL	M	Return to EQ** TK in front	Backwash or Rupture Disk
V-217	3 in BALL	M	Treated Effluent Line	Effluent from GAC B
V-218	3 in BALL	M	Return to EQ** TK	Backwash or Rupture Disk
V-219	3 in BALL	M	Treated Effluent Line	Influent to GAC C
V-220	3 in BALL	M	Return to EQ** TK between GAC B and C	Backwash or Rupture Disk Return to EQ**
V-221	3 in BALL	M	Treated Effluent Line in	Treated Effluent Discharge
V-222	3 in BALL	M	Return to EQ** TK in front	Backwash or Rupture Disk

** = Equalization

APPENDIX 4
Page 5 of 5

VALVE NO	SIZE/TYPE	MANUAL OR AUTO	LOCATION	FUNCTION
V 223	3 in BALL	M	Treated Effluent Line between GAC C and D	Effluent from GAC C
V-224	3 in BALL	M	Return to EQ** TK between GAC C and D	Backwash or Rupture Disk Return to EQ**
V 225	3 in BALL	M	Treated Effluent Line between GAC C and D	Influent to GAC D
V-226	3 in BALL	M	Return to EQ** TK between GAC C and D	Backwash Return to EQ** Tank
V 227	3 in BALL	M	Treated Effluent Line in front of GAC D	Treated Effluent Discharge
V-228	3 in BALL	M	Return to EQ** TK in front of GAC D	Backwash or Rupture Disk Return to EQ**
V-229	3 in BALL	M	Treated Effluent Line after GAC D	Effluent from GAC D
V-230	3 in BALL	M	Return Line to EQ** Tank after GAC D	Effluent Return to EQ** Tank
V 231	3 in BALL	M	Treated Effluent Line after GAC D	Final Effluent Discharge
V-232	3 in BALL	M	Return Line to EQ** Tank after GAC D	Final Effluent Return to EQ** Tank

** = Equalization